

### THE OFFICE ACTION

In the Office Action issued on June 30, 2005, the Examiner objected to the specification and in particular to the chemical expression of the phosphors.

The Examiner rejected **claims 1-43** under 35 U.S.C. §112, second paragraph as being indefinite. The Examiner rejected **claims 1-3, 6, 7, 8, 12, and 13** under 35 U.S.C. §103(a) as being unpatentable over WO 03/080763 to Juestel ("Juestel") in view of JP 11-261105 to Sugawara et al. ("Sugawara"). The Examiner also rejected **claims 14-16, 19-21, and 26** under 35 U.S.C. §103(a) as being unpatentable over Juestel in view of Sugawara and further in view of U.S. Patent Application Publication Nos. 2003/0155856 to Shiiki et al. ("Shiiki") and 2002/0174794 to Lowden et al. ("Lowden"). The Examiner also rejected **claim 17** under 35 U.S.C. §103(a) as being unpatentable over Juestel, Sugawara, Shiiki, and Lowden and further in view of U.S. Patent No. 6,515,417 to Duggal et al. ("Duggal"). The Examiner further rejected **claims 1-3** under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,621,211 to Srivastava et al. ("Srivastava") in view of Sugawara. The Examiner rejected **claim 4** under 35 U.S.C. 103(a) as being unpatentable over Juestel et al. in view of Sugawara et al. and further in view of Duggal et al. **Claim 5** was rejected by the Examiner under 35 U.S.C. 103(a) as being unpatentable over Juestel et al. and Sugawara et al. and further in view of U.S. Patent Application Publication No. 2001/0000622 A1 to Reeh et al. ("Reeh"). The Examiner also rejected **claim 18** under 35 U.S.C. 103(a) as being unpatentable over Juestel et al. and Sugawara et al. and further in view of Reeh et al. **Claims 27, 28, 38 and 39** were rejected by the Examiner under 35 U.S.C. 103(a) as being unpatentable over Srivastava et al. in view of Sugawara et al. The Examiner further rejected **claims 32-34** under 35 U.S.C. 103(a) as being unpatentable over Srivastava et al. and Sugawara et al. and further in view of Juestel et al. The Examiner also rejected **claims 30** under 35 U.S.C. 103(a) as being unpatentable over Srivastava et al. and Sugawara et al. and further in view of Duggal et al. **Claim 31** was rejected under 35 U.S.C. 103(a) by the Examiner as being unpatentable over Srivastava et al. and Sugawara et al. and further in view of Reeh et al. The Examiner further rejected **claims 40 and 43** under 35 U.S.C. 103(a) as being unpatentable over Juestel et al. in view of U.S. Patent Application Publication No. 2003/0209705 A1 to Emerson et al. ("Emerson").

Claims 1-45 are pending in the application.

### **REMARKS**

Amendments have been made to the specification and claims to address the Examiner's objections to these. In light of these amendments and the following comments, Applicants respectfully request withdrawal of all rejections.

#### **A. The Claims Now Comply with 35 U.S.C. §112**

The claims and specification have been amended to correct inconsistencies in the formulation of the phosphor and now recite in all instances that the correct phosphor composition is  $(\text{Sr,Ba,Ca})_2\text{SiO}_4\text{:Eu}$ .

With regard to the §112 rejection, Applicants are somewhat confused by the Examiner's rejection based on the use of the notation  $(\text{Sr,Ba,Ca})$  in the phosphor composition as being allegedly indefinite "because the stoichiometric ratios, whether characterizing the relative concentrations of the alkaline earths or the relative concentrations of the group of alkaline earths relative to the orthosilicate ions are not defined.

As correctly assumed by the Examiner on page 4 of the Office Action, the notation  $(\text{Sr,Ba,Ca})$  in the phosphor  $(\text{Sr,Ba,Ca})_2\text{SiO}_4\text{:Eu}$  is identical to  $\text{Sr}_{1-x-y-z}\text{Ba}_x\text{Ca}_y\text{Eu}_z$ , where  $0 \leq x, y < 1$ . Thus, the use of the present notation indicates that the phosphor can have any combination of Sr, Ba, and/or Ca. The Applicants would like to point out that this notation is commonly used in the phosphor art. See for example, the Srivastava patent, Shiiki (paragraph 8), Nose, which lists  $(\text{Sr,Ba})\text{Al}_2\text{Si}_2\text{O}_8\text{:Eu}$  (col. 9, line 20), as well as the official Nichia phosphor website (<http://www.nichia.com/product/phosphors.html>), which discloses the use of  $(\text{Sr,Ca,Ba,Mg})_5(\text{PO}_4)_3\text{Cl:Eu}$ . Thus, Applicants submit that this notation has an accepted meaning in the industry and does not render the present claims indefinite. Withdrawal of this rejection is respectfully requested.

With regard to the Examiner's rejection based on the use of the wording "at from" as being internally contradictory, Applicants respectfully traverse. The Examiner states that the term "at" implies a fixed value. Where is the Examiner getting this interpretation

of “at”? The use of the term “at” is not so limited and Applicants submit that the phrase “at from” should be read to mean the same as “in a range from”. If the Examiner still wishes to maintain this rejection, Applicants request the Examiner to provide case law or other supporting documentation supporting his limited interpretation of the meaning of “at”. Applicants otherwise request withdrawal of this rejection.

**B. The Claims are Patentable Over Juestel in View of Sugawara**

The Examiner rejected claims 1-3, 6, 7, 8, 12, and 13 under 35 U.S.C. §103(a) as being unpatentable over Juestel in view of Sugawara. Applicants respectfully traverse.

As amended, claim 1 now recites that the semiconductor light source has a peak emission below 450 nm. As mentioned by the Examiner, Juestel discloses a blue emitting LED having peak emission of from 450-480 nm. Likewise, Sugawara discloses a blue or green emitting semiconductor having a peak emission at about 450 nm (see abstract and paragraph 7).

Thus, even assuming that it is appropriate to combine the teachings of Juestel and Sugawara, such a combination fails to disclose or suggest a device including a UV emitting semiconductor and the recited elements. Applicants request withdrawal of this rejection.

**C. The Claims are Patentable Over Juestel in View of Sugawara, Shiiki and Lowden**

The Examiner rejected claims 14-16, 19-21 and 26 under 35 U.S.C. §103(a) as being unpatentable over Juestel in view of Sugawara, Shiiki and Lowden. Applicants respectfully traverse.

Claim 14 recites that the semiconductor light source is a UV emitting source has a peak emission in the range 250-450 nm. As noted above, Juestel discloses a blue emitting LED having peak emission of from 450-480 nm. Likewise, Sugawara discloses a blue or green emitting semiconductor having a peak emission at about 450 nm (see abstract and paragraph 7). The reasons why the proposed combination of Sugawara and Juestel do not render the present claims unpatentable is presented above.

The addition of Shiiki and Lowden to the proposed combination does not cure the deficiency. That is, Shiiki and Lowden are cited for the recitation of a fluorogermanate (specifically  $\text{Mg}_4\text{FGeO}_6\text{:Mn}$ ) as a red emitting phosphor in LED devices. Even assuming the propriety of combining this teaching with the disclosure of Juestel and Sugawara, such a combination would still not disclose all of the elements of the present claims.

The Examiner's reasoning (page 6, 3<sup>rd</sup> paragraph of the Office Action) as to why Juestel inherently teaches a UV light source is confusing and incorrect at best, and disingenuous at worst. Juestel does not teach a UV light source and in fact actually teaches against the use of such a light source. Specifically, Juestel discloses that "It has been found that color rendering can decrease at excitation energies below 450 nm" (page 6, lines 10-11). Thus, not only does Juestel not disclose or suggest the use of a semiconductor having a peak emission in the range below 450 nm, it teaches away from the combination with any other reference disclosing such a light source, as it would detrimentally affect the color rendering of the resulting light. The Examiner's attempted argument to equate the blue LED of Juestel with the lower wavelength light source of the present claims is clearly improper and merely an attempt to stretch the disclosure of Juestel to meet the limitations of the present claims.

Based on the above, Applicants respectfully request withdrawal of this rejection.

**D. The Claims are Patentable Over Juestel in View of Sugawara, Shiiki, Lowden and Duggal**

The Examiner rejected claim 17 under 35 U.S.C. §103(a) as being unpatentable over Juestel in view of Sugawara, Shiiki, Lowden and Duggal. Applicants respectfully traverse.

The reasons why the combination of Juestel in view of Sugawara, Shiiki, and Lowden fails to render claim 14 unpatentable is set forth above. Claim 17 depends from claim 14 and thus contains all the limitations thereof.

The Examiner cites Duggal as teaching an organic emission structure. Even assuming this to be true and even assuming the propriety of combining Duggal with the other references, such a combination would still not disclose or suggest all of the

limitations of the parent claim 14, and thus claim 17. Based on this, Applicants respectfully request withdrawal of this rejection.

**E. The Claims are Patentable Over Juestel in View of Sugawara and Duggal**

The Examiner rejected claim 4 under 35 U.S.C. §103(a) as being unpatentable over Juestel in view of Sugawara, and Duggal. Applicants respectfully traverse.

The reason why the combination of Juestel in view of Sugawara fails to render claim 1 unpatentable is set forth above. Claim 4 depends from claim 1 and thus contains all the limitations thereof.

The Examiner cites Duggal as teaching an organic emission structure. Even assuming this to be true and even assuming the propriety of combining Duggal with the other references, such a combination would still not disclose or suggest all of the limitations of parent claim 4. Based on this, Applicants respectfully request withdrawal of this rejection.

**F. The Claims are Patentable Over Juestel in View of Sugawara and Reeh**

The Examiner rejected claims 5 and 18 under 35 U.S.C. §103(a) as being unpatentable over Juestel in view of Sugawara, and Reeh. Applicants respectfully traverse.

The reason why the combination of Juestel in view of Sugawara fails to render claims 1 and 14 unpatentable is set forth above. Claims 5 and 18 depend from claims 1 and 14, respectively, and thus contains all the limitations thereof.

The Examiner cites Reeh as teaching coating the phosphor on the surface of the light source. Even assuming this to be true and even assuming the propriety of combining Reeh with Juestel and Sugawara, such a combination would still not disclose or suggest all of the limitations of claims 5 and 18. Based on this, Applicants respectfully request withdrawal of this rejection.

**G. Srivastava is not a Valid Prior Art Reference**

The Examiner made a number of rejections based on Srivastava in combination with one or more references (numbered sections 5, 9-12). Applicants respectfully

traverse based on the fact that Srivastava is not a valid prior art reference.

Srivastava was filed on May 15, 2000 and was published Sept 16, 2003, which is less than one year prior to the filing date of the present application, March 10, 2004.

Submitted herewith is a 37 C.F.R. §1.131 declaration of one of the inventors of the present invention. The declaration is submitted to evidence a date of conception and reduction to practice of the present invention in the United States prior to the publication date of Srivastava, September 16, 2003. Because the present invention was conceived and reduced to practice prior to the publication date of Srivastava, Srivastava therefore cannot qualify as prior art under §102(a) and can only qualify as prior art under § 102(e).

To remove Srivastava as a §102(e) reference, Applicants now assert that the present application and Srivastava, at the time the invention of the present application was made, were owned by the same person or subject to an obligation of assignment. The claimed invention was made by or on behalf of parties to a joint research agreement that was in effect on or before the date the claimed invention was made, the claimed invention was made as a result of activities undertaken within the scope of the joint research agreement, and the application for patent for the claimed invention discloses the names of the parties to the joint research agreement. According to § 103(c), Srivastava shall not preclude patentability of the subject application. Applicants respectfully request that the Examiner remove the claim rejections and allow the application to issue.

Since the Examiner cannot properly apply Srivastava to any of the claims pending in the application, Applicants will not respond to any arguments raised by the Examiner using Srivastava in rejecting the claims. The lack of response should not be taken as an admission to the validity of any of the arguments presented by the Examiner.

#### **H. The Claims are Patentable Over Juestel in View of Emerson and Nose**

The Examiner rejected claims 40 and 43 under 35 U.S.C. §103(a) as being unpatentable over Juestel in view of Emerson and Nose. Applicants respectfully traverse.

First, there is no motivation to combine these references. As detailed above, Juestel discloses the use of a blue emitting LED. As noted above, Juestel does not teach a light source having a peak emission below 450 nm and in fact actually teaches against the use of such a light source. Specifically, Juestel discloses that "It has been found that color rendering can decrease at excitation energies below 450 nm" (page 6, lines 10-11). Thus, not only does Juestel not disclose or suggest the use of a semiconductor having a peak emission in the claimed range, it teaches away from the combination with any other reference disclosing such a light source, as it would detrimentally affect the color rendering of the resulting light.

Accordingly, it would not have been obvious to "replace the LED dominant in blue in Juestel et al. by a UV LED", despite the Examiner's statements to the contrary. Thus, it would not be obvious to combine Emerson with Juestel. As such, it would also not be obvious to combine a third, blue phosphor in Juestel, as blue emission is already provided by the blue LED. Thus, there is no motivation to combine Nose with Juestel.

### **CONCLUSION**

It is respectfully submitted that the subject application is now in better condition for examination.

Respectfully submitted,

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Attachment: §1.131 Declaration (with Exhibit A)